

## Paratherm NF<sup>®</sup> vs. Synthetic Heat Transfer Fluids

Synthetic aromatic heat transfer fluids continue to occupy an important place in liquid heat transfer systems. Synthetics are best specified where natural fluids cannot function: at system temperatures above 600°F, at very low temperatures and, if they are able, in the vapor phase.

Here are some of the reasons you might consider a heat transfer fluid manufactured from natural feedstocks, like the Paratherm NF<sup>®</sup> non-fouling, non-toxic fluid.

### Lower Cost

The purchase cost of many synthetic fluids ranges from slightly to substantially higher than the cost of the NF fluid. Handling and disposal add significantly to this cost. You'll want to know why.

### Improve Efficiency

At medium temperatures synthetic fluids typically provide equal-to-higher film coefficients than the NF fluid. However as temperatures begin to climb these differences become considerably smaller — until at the high end of the range, Paratherm's coefficients exceed those of most synthetics. (Higher film coefficients mean greater availability of BTU's at the user surface.) The NF fluid is more efficient.

### Longer Fluid Life

When properly specified and operated in well-designed systems, all heat transfer fluids will provide

good service for reasonable periods of time. However, degradation caused by oxidation, overheating and contamination will cut this service dramatically.

Due to its non-fouling characteristic, the NF fluid is considerably more forgiving. It's service life is proven equal to or greater than the synthetics.

### Human Safety

Most synthetic fluids are moderately or significantly toxic. In comparison, the NF fluid is completely non-toxic (it is certified food-grade).

Safety Data Sheets for aromatic fluids indicate that small quantities of benzene gas may form and concentrate in the expansion tank when the fluid is severely overheated.

Severe overheating is most often the direct result of low flows at the heated surface. Occurring at the fluid's film layer, overheating can happen even at low or moderate fluid temperatures. You'll notice little, if any, change in the fluid's bulk temperature.

If you are using aromatic fluids, you should make sure the system's expansion tank is vented to an area where the fumes cannot concentrate. You should carefully review the fluid's Material Safety Data Sheet (MSDS) for toxicity information regarding respiratory, ingestion and skin-contact. Skin dermatitis and respiratory problems have been reported with virtually all synthetics.

The NF fluid has no odor and has been reported to actually soften the skin.

### Environmental Safety/Disposal

While no fluid should ever be permitted to enter the environment, mishaps can and do occur. Hazardous or regulated waste procedures must be followed in the clean-up and disposal of most synthetic fluids.

However, the same simple clean-up procedures for light lube oils can be employed with releases of the NF fluid. And, used or contaminated NF fluid can be safely combined with spent lube oils and sent to the local oil recycler (EPA, citation 57FR21524). This helps conserve natural resources and precious landfill space. The NF fluid has also passed rigorous Bioassay with three species (Rainbow trout, saltwater shrimp and freshwater shrimp).

### Fluid Fouling

Fouling has been observed with all synthetic fluids. This fouling normally occurs as fluid flow drops at the heated surfaces. Less heat is removed, the heat balance is upset and film temperatures quickly soar. This high heat flux overcomes the strength of the fluid's chemical bonds. As they break, fine, amorphous "sooty" carbon is formed. Much of this carbon immediately adheres to the heated surfaces and

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bakes on, creating insulating layers.

Under similar severe overheat conditions, the **NF** fluid evolves carbon granules that do not adhere. Instead, they remain in suspension and are easily filtered out. This is particularly important in electrically heated systems where hard baked-on carbon deposits most often occur.

## No Odor

Even when operated within their normal temperature range synthetic heat transfer fluids can produce a mild to heavy odor. In contrast, the **NF** fluid has none.

## Applications

The **NF** fluid has for years been successfully used in a broad variety of demanding applications in the processing of chemicals, food,

pharmaceuticals, oils, adhesives and petroleum. It provides precise, uniform temperature control in process applications including die casting, injection molding, curing, laminating, calendering, drying, and printing — just to name a few.

The **NF** fluid is approved, recommended and/or specified by a wide range of original equipment manufacturers whose equipment is used in these processes.

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**Questions?** We'd like to hear from you. Call toll-free, 800-222-3611, or fax or e-mail us, or visit our website, [www.paratherm.com](http://www.paratherm.com).

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Note: The information and recommendations in this literature are made in good faith and are believed to be correct as of the below date. You, the user or specifier, should independently determine the suitability and fitness of Paratherm heat transfer fluids for use in your specific application. We warrant that the fluids conform to the specifications in Paratherm literature. Because our assistance is furnished without charge, and because we have no control over the fluid's end use or the conditions under which it will be used, we make no other warranties—expressed or implied, including the warranties of mer-

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